

Death Valley Geology Field Trip Spring 2011

Credits: 3.0

CRN: 727

Prerequisite: an introductory Geology course (Geol 115, 120, 150, or 182) and Geol 220 or Geol 201

Class meets: MW, 8:00-8:50 am (intermittently throughout course)

Instructor: Les Hasbargen

Office: 219 Science 1 Ph. 607-436-2741

Office hours: MWF, 11:00-11:50 am

Personal web site: <http://employees.oneonta.edu/hasbarle/index.html>

Required Textbook: *Rite in the Rain Geology Field Note Book*. You can find them online at <http://www.amazon.com/gp/product/B0011DGJSC>, ISBN 978-1-932149-35-7.

Geology Underfoot in Death Valley and Owens Valley, by Robert P. Sharp and Allan Glazner, Mountain Press Publishing Company, Missoula; 1997; ISBN 0-87842-362-1, provides general geologic background on many of the sites we will visit.

Optional Textbooks: If you anticipate field work in your future, I recommend purchasing a copy of *Geology in the Field*, by Robert Compton (John Wiley and Sons, 1985; ISBN: 0-471-82902-1). This text provides a wealth of standard approaches to geologic data description and collection.

Course Description

This field course examines the geology and geomorphology in a continental rift/trans-tensional setting (Death Valley) in eastern California. The nearly two miles of relief expose spectacular outcrops of rocks ranging from middle Proterozoic to the present, and document events ranging from glaciation, early evolution of life, intrusive and extrusive igneous activity, diverse depositional environments, and large scale deformation. The region presents a rich diversity of landscapes, and includes sand dunes, playas, alluvial fans, gorges, high mountains, exposed fault surfaces, volcanic craters, and large landslides. Students will investigate the tectonic structures, volcanic settings, and the connections between modern depositional processes and environments and sedimentary structures that are preserved in the rock record. A minimum of 9 students is needed for the trip to run. Costs will not exceed \$1200 per student including air fare, food, lodging, transportation, and tuition. Students will stay in campgrounds. Students must be a major in Earth Sciences or Environmental Science with an Earth Science concentration. Course runs in odd years in spring, with a field trip over spring break.

Course Justification

There is a persistent need for trained geoscientists with experience in geologic field investigation. This course will expose students in Geology, Earth Science, Environmental Sciences—Earth Science, and Water Resources programs to an active plate tectonic boundary in southern California, also known as Death Valley National Park (DVNP). DVNP provides extraordinary learning opportunities for students, exposing numerous faults and folds, a spectrum of rocks including clastic and chemical sedimentary rocks, explosive and effusive volcanic rocks,

intrusive igneous rocks and metamorphic rocks. In addition, desert springs associated with groundwater flow, topography, and faults provide superb examples of hydrology. The landscapes in the area exhibit premier examples of arid region landscape processes and geomorphology, including uplifting mountains, huge landslides, dunes, playas, alluvial fans, and desert pavement.

Geol 394 is a field course that builds on prior course work in lecture and labs and integrates that material in a field setting. The nearly 100% exposure of rocks and structures in the area offers a view into Earth's processes and the geologic record of past environments. In addition, the close juxtaposition of eroding mountains, and modern depositional settings for clastic and chemical sediments permits field based projects which couple stratigraphy with sediment transport processes in a very direct way. Field exercises will require students to identify rocks, characterize processes, and develop skills in collecting and analyzing spatial and geologic information. This course will be a profound learning experience.

The course will take place mostly on the field trip, which will run for 11 days over spring break. After returning, students will select a location for greater examination, and present their investigation of the area to the class. Students will be evaluated based on participation on the field trip, field notes, field maps, and post-trip presentation.

Specific course objectives. Students learn how to characterize sedimentary environments and processes, map rock units, identify faults and folds, recognize effusive and explosive volcanoclastic rocks, and understand how arid region geomorphic features form.

Student Learning Outcomes for the Geology Major addressed within this course

- Students will demonstrate their ability to describe and identify geologic materials. (GEOL-SLO #1)
- Students will demonstrate their understanding of how rocks, sediments, and soils form. (GEOL-SLO #2)
- Students will demonstrate comprehension of the role of deep time in Earth history. (GEOL-SLO #3)
- Students will demonstrate understanding of processes that occur on and within the Earth and interactions among Earth's systems. (GEOL-SLO #5)
- Students will demonstrate their ability to collect and analyze geologic information in field and laboratory settings. (GEOL-SLO #6)
- Students will demonstrate their ability to apply scientific reasoning and technology to solve geologic problems. (GEOL-SLO #8)
- Students will demonstrate their ability to work collaboratively to solve geologic problems (GEOL-SLO #9)
- Students will utilize scientific methods to design and execute research projects that include collection, analysis and interpretation of data. (GEOL-SLO #10)
- Students will demonstrate their ability to communicate scientific and technical information effectively through appropriate oral, visual and written presentation. (GEOL-SLO #11)

Grades

Students will be evaluated based on **participation (5%)** on the field trip, **field notes (20%) and maps (60%)**, and a post-trip **presentation (15%)**.

Participation (5%) on the field trip, which includes asking questions in the field, doing pre-trip exercises, assisting with tent set-up and tear down, doing dishes at the camp, helping with food preparation, cleaning up the camping area, and assisting with packing up camping gear.

Field notes (20%). These must include a record for each stop, including date, time, location (UTM GPS location), verbal descriptions, sketches, and comments on key themes at the stop.

Geologic maps (60%). Students will create geologic maps for the reconnaissance exercises at select sites including Turtlebacks/Natural Bridge, Golden Canyon, Gower Gulch, Mosaic Canyon, Titus Canyon, and Coyote Canyon. Each map must have a descriptive title, author, date, and lithologic legend. The finished map (the desk copy) should have lithologic contacts, folds, faults, and rock orientation symbols. Lithologic units must be color-coded in the map and on the legend (desk copy only). Students are encouraged to transfer their map data to a GIS format, but paper maps with legible writing and hand-drawn features will not receive less credit.

Post trip presentation (15%). Students will choose a topic on the trip to investigate further in the scientific literature, and present their findings to the group. The presentation must be in the form of a slide show; must have a title, author, and date; must provide new information about the site not contained in this guide book or the textbook, and should give a more detailed picture of what is known about the topic or site.

All efforts will be assessed with a weighted rubric, where separate aspects of the exercise will receive a mark ranging from excellent to no credit. Each aspect will have a weight (content and analysis is more important than spelling, for instance). Aspects of an exercise might include content, analytical treatment, overview of the problem, summary of the project, recommendation for action, grammar, scientific writing style, and the like. Rubrics for field notes, geologic maps, and the presentation will be handed out early in the course. The rubric score will be re-scaled to the University curve, and final grade assignments will be guided by the standard University curve given below.

Percent	Grade	Percent	Grade	Percent	Grade	Percent	Grade
93-100	A	87-89.9	B+	77-79.9	C+	67-69.9	D+
90-92.9	A-	83-86.9	B	73-76.9	C	63-66.9	D
< 60	F	80-82.9	B-	70-72.9	C-	60-62.9	D-

Schedule (*this schedule is subject to change as needed*).

Date	Day	Topic/Reading	Camp
Jan 19	W	Class does not meet	
Jan 24	M	Meet to discuss course; handouts	
Jan 26	W	Exercise: Describing rocks in the field	
Jan 31	M	Exercise: Describing rocks in the field	

Feb 2	W	Exercise: Strike-dip; Mapping geologic features	
Feb 7	M	Intro to Death Valley Geology	
Feb 9	W	Intro to GIS: Integrating field data with imagery	
Feb 14	M	Preparations for the trip	
Feb 16	W	Class does not meet	
Feb 18	F	Travel: Albany-Las Vegas-Tecopa, CA	Tecopa HS
Feb 19	Sat	Rest. Sprgs, Shoreline B., Split Cone, Mormon Pt	Furnace Creek
Feb 20	Sun	Badwater Turtleback, Devils GC, Artists Drive	Furnace Creek
Feb 21	M	Golden Cyn	Furnace Creek
Feb 22	T	Gower Gulch, Hole in the Wall	Stovepipe Wells
Feb 23	W	Mosaic Cyn, Mesquite Dunes	Panamint CG
Feb 24	TH	Panamint Valley and Coyote Cyn	Mesquite
Feb 25	F	Titus Cyn (Yucca Mtn?)	Mesquite
Feb 26	SAT	Ubehebe, Racetrack Playa?	Stovepipe Wells
Feb 27	SUN	Students' choice	Stovepipe Wells
Feb 28	M	Dante's View: DVNP to Oneonta	
Mar 7	M	Students select topics for presentation	
Mar 9	W	Review of topics with instructor	
Mar 14 -Apr 13		Work on presentation	
Apr 16-25	M	SPRING BREAK!! NO CLASSES	
Apr 27	W	No Class; Work on presentation	
May 2	M	Student Presentations	
May 4	W	Student Presentations	
May 9	M	Student Presentations	
May 11	W	Student Presentations; Maps, and Field Notes Due	
May 18	W	8:00-10:30 a.m. Wrap-up; Course Evaluations	

Emergency Evacuation/Shelter-in-Place Procedures In the event of an emergency evacuation (i.e. fire or other emergency), classes meeting in Science I are directed to reassemble at Chase Gymnasium so that all persons can be accounted for. Complete details of the College's emergency evacuation, shelter-in-place, and other emergency procedures can be found at <http://www.oneonta.edu/security>.

Spring 2011 Calendar

January 16-18	Sunday-Tuesday	New student arrival & orientation
January 19	Wednesday	Classes begin
February 18	Friday	College closes after last class
February 28	Monday	Classes resume
April 15	Friday	College closes after last class
April 26	Tuesday	Classes resume
May 11	Wednesday	Follow Monday class schedule
May 12-18	Thursday-Wednesday	Finals
May 21	Saturday	Commencement

Course Guidelines and Expectations for Students

The following list provides a baseline of what is expected from students in this course (quoted section from the list of *Student Responsibilities* approved by SUNY Oneonta).

“In class responsibilities

Students will:

- Attend all classes and arrive punctually.
- If unavoidably late for a class, enter quietly and unobtrusively, and behave in other required ways to minimize distraction.
- Remain alert and attentive during lectures, discussions, and other class/lab activities.
- Avoid unnecessary conversation during lectures, discussions, and other class/lab activities.
- Contribute to class experiences by asking relevant questions, offering relevant examples or views, adequately answering questions posed by others, engaging in critical and independent thought, and challenging both the instructor and the curriculum materials assigned for the course.
- Demonstrate courtesy and respect in dealing with instructors and classmates.
- Recognize and seek to understand diverse points-of-view.”

In the field responsibilities

Students will:

- Assemble all materials they need to conduct field investigations and bring these items with them (this list will be supplied at the start of the semester)
- Participate in group camping activities, such as setting up and taking down tents, preparing food and cleaning up after meals
- Be respectful of fellow students on the trip and of other campers in the campground
- Maintain quiet time from 10 pm to 6 am in the campground (or according to the local campground guidelines)

Check list of Useful Items (Think Christmas Wish List!)

- _____ Hat—preferably wide brim to shade the ears/neck
- _____ Sunglasses
- _____ Hiking shoes
- _____ Sunscreen
- _____ Warm jacket
- _____ Gloves
- _____ Rain jacket
- _____ Undergarments
- _____ Long-sleeved and short-sleeved shirt
- _____ Several pair of socks
- _____ A pair of long pants and shorts
- _____ Toiletries (check with airlines for permissible container sizes)
- _____ Towel
- _____ Flipflops or shower sandals
- _____ Sleeping bag (to 25°F)
- _____ Sleeping mattress
- _____ Flashlight/headlamp
- _____ Eating utensils (fork, spoon, knife, plate/bowl, cup)
- _____ Water bottle (just make sure it's plane transport friendly; or buy water bottles in CA)
- _____ Camera (optional)
- _____ Field book
- _____ *Compass with azimuth and inclinometer
- _____ Hand lens (see Geo-Tools for geology hardware: <http://www.geo-tools.com/index.htm>)
- _____ *Rock hammer (protective eye wear/goggles are a good idea)
- _____ Calculator
- _____ Whistle (in case you get lost)
- _____ Clipboard and/or map case (you can make your own with a clear plastic cover)
- _____ Pencils (mechanical pencils, or wood pencils with sharpener)
- _____ Pens and Permanent Marker
- _____ Protractor/6" ruler
- _____ *GPS unit
- _____ Charger for cell phone/electronic devices
- _____ Medium size duffel bag for clothes, sleeping bag, mattress, and personal items (choose a size within airline guidelines)
- _____ Day pack for lunch/snack items, pockets for water bottles, room for rain jacket, misc. tools

* means item can be checked out from Earth Sciences Dept

Waiver for Use of Photographs

Please initial the statements below and sign and date this form at the bottom, if you agree to the terms.

_____ I understand that photographs will be taken of me during the course of this class field trip (Geol 394, Death Valley Geology Trip, Spring 2011).

_____ I grant permission to Earth Sciences Department and SUNY Oneonta for the photographs to be used for educational and promotional purposes.

Name (Please Print)

Signature

Date